

## 1.7 Applications of Linear Systems: Percent/Mixture Problems

1. Percentages can be expressed as a fraction or a decimal.

$$25\% = \frac{25}{100} = 0.25$$

2. Use the wording of the question to help you choose your unknowns (variables).

3. Make sure your units are consistent.

Assigned Work: p. 27 # 7 p. 39 # 11 p. 55 # 10, 12

Ex. 1) One type of granola is 30% fruit, and another type is 15% fruit. What mass of each type of granola should be mixed to make 600g of granola that is 21% fruit?

$$\begin{aligned} \textcircled{1} \quad x + y &= 600 \\ \textcircled{2} \quad 0.30x + 0.15y &= 0.21(600) \\ \text{Isolate } x \text{ in } \textcircled{1} \\ x &= 600 - y \\ \text{Sub } \textcircled{1} \text{ into } \textcircled{2} \\ 0.30(600 - y) + 0.15y &= 126 \\ 180 - 0.30y + 0.15y &= 126 \\ \text{Sub } y = 360 \text{ into } \textcircled{1} & \quad -0.15y = 126 - 180 \\ x + y &= 600 \quad -0.15y = -54 \\ x &= 600 - 360 \quad -0.15 \quad -0.15 \\ x &= 240 \quad y &= 360 \end{aligned}$$

∴ we mix 240g of 30% granola and 360g of 15% granola, to make the 21% granola.

## Copy and try this!

Ex. 2) A chemistry teacher needs to make 10 L of 42% sulphuric acid solution. The acid solutions available are 30% sulphuric acid and 50% sulphuric acid, by volume. How many litres of each solution must be mixed to make the 42% solution?

$$\textcircled{1} x + y = 10$$

$$\textcircled{2} 0.3x + 0.5y = 0.42(10)$$

## Try this!

Ex. 3) A candy store is preparing a mixture of chocolate raisins and chocolate peanuts. The raisins sell for \$2.22/kg and the peanuts for \$1.75/kg. How much of each type must be mixed to make 20 kg of a mixture that will sell for \$41?

$$\textcircled{1} x + y = 20$$

$$\textcircled{2} 2.22x + 1.75y = 41$$

$$\frac{41}{20} = 2.05/\text{kg}$$

p 27 #7   p 39 #11   p 55 #10, 12